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KS 551 (2012) (English): Emulsified Sources - Specification (Draft Standard)

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Emulsified Sources - Specification

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Technical Committee representation

The following organizations were represented on the Technical Committee:
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Kenya Industrial Research Development Institute
Jomo Kenyatta University of Science and Technology
Bidco Oils Refineries
Department of Public Health, MOPHS
Division of Nutrition – MOMS
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In order to keep abreast of progress in industry, Kenya standards shall be regularly reviewed. Suggestion for improvements to published standards addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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KENYA STANDARD

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Emulsified Sources - Specification

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Foreword

This Draft Kenya Standard was prepared by the Technical Committee on Edible Oils and Fats under the guidance of the Standards Project Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This standard applies to emulsified sauces such as mayonnaise and related products for direct consumption including products which are destined for catering purposes. These products are consumed in large quantities in catering establishments. Food is one of the most important tools of trade in the tourist industry and so Kenya being a tourist destination must therefore be in a position to meet the tastes of the many varied visitors. This standard takes into account all the necessary factors and ensures that all products which are covered are prepared and handled safely.

This revision was undertaken to incorporate a table on microbiological limits, revise the limits for heavy metals and method of test for determination of oil and to combine Tables 1 and 2 on compositional requirements into one. The revision was also undertaken to address the fat phase of these products to align them to the best international practices.

During the preparation of this standard, reference was made to the following documents.
Codex Stan 168 – 1989: Codex Standard for Mayonnaise (Regional European standard)
Vegetable Oils in Food Technology, Frank D. Gunstone, CRC Press.
The lipid Handbook, 3rd ed, John H. Et. Al, CRC press.

Acknowledgement is hereby made for the assistance obtained from these sources.

Emulsified Sources - Specification

1. Scope

This Draft Kenya Standard prescribes the requirements and methods of test for emulsified sauces such as mayonnaise and mayonnaise like products for direct consumption including products which are destined for catering purposes as well as for household consumption.

2.0 Normative references

The following reference documents are indispensable for the application of this standard. The latest edition of the document shall be used:

KS 459 Specification for drinking water;

KS CODEX STAN 192*: General standard for food additives*

KS 1500: Code of practice for hygiene in the food and drink manufacturing industry

Cap. 242: *Public Health Act of laws of Kenya*

Cap. 254: *Food Drugs and Chemical Substances Act of laws of Kenya*

Cap. 513: *Weights and Measure regulations of the Laws of Kenya*.

KS EAS 38, *Labeling of prepackaged foods*.

KS 220, Methods for the microbiological examination of foods

KS 63: Guide on maximum limits of pesticides residues in foods

KS ISO 16050, Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High-performance liquid chromatographic method

3.0 Description

3.1 Product Definitions

3.1.1 *mayonnaise* — A smooth, thick, stable emulsion of at least 50 % edible vegetable oil, water, emulsifiers and acidifying agent, with or without the addition of optional ingredients indicated in this standards.

3.1.2 *aioli* — Mayonnaise as defined in **3.1.1** to which sufficient garlic has been added to characterize the sauce (*see* Table 1).

3.1.3 *salad cream, salad dressing, sauce for salad or sauce for fried potatoes* — An emulsion produced from edible vegetable oil, a solution of an acidifying agent and egg yolk, milk protein or vegetable protein, and in which the fat content is not less than 15 per cent (m/m), see Table 1.

3.1.4 *bearnaise sauce* — An emulsion produced from edible vegetable oils and/or butter, a solution of an acidifying agent , egg yolks, estragon (terragon) and in which the fat content is not less than 65 per cent (m/m), see Table 1.

3.1.5 *tartar sauce, mustard sauce or cocktail sauce* — Emulsions produced from edible vegetable oil, a solution of an acidifying agent, egg yolks and characterizing ingredients in accordance with Table 1 and in which the fat content is not less than 50 per cent (m/m).

4. Essential composition and quality criteria

4.1 Raw Materials

4.1.1 All ingredients shall comply with the relevant Kenya Standards. Water shall be of potable quality and shall comply with the requirements of KS 05-459.

4.1.2 Eggs and egg products shall be from the hen, unless otherwise specified.

4. 1.3 Ingredients added to impart a characterizing flavour to the products shall be used in quantities sufficient to influence significantly the organoleptic properties of the product.

4. 1.4 The products, when stored under refrigeration, shall maintain their consistency.

4. 1.5 The winterized oil shall be used. The phases of the oil shall not separate when placed in the refrigeration.

4.2 Compositional Requirements

Mayonnaise and mayonnaise-like products shall comply to the compositional requirements in Table 1 below

Table 1. Compositional requirements for mayonnaise and mayonnaise-like products

S. No.	Product	Fatty Phase (Minimum)	Technically pure* egg yolk minimum content expressed as percentage of the whole product	Vegetable protein or milk protein	Other characterizing ingredients
(i)	Mayonnaise	Edible vegetable oil, 50% (m/m)	5% m/m	GMP	-
(ii)	Aioli	Edible vegetable oil, 50% (m/m)	5% m/m	”	Garlic
(iii)	Salad cream, salad dressing, sauce for salad, sauce for fried potatoes	Edible vegetable oil, 15% (m/m)	2.5% m/m	”	-
(iv)	Bearnaise sauce	Edible vegetable oil or butter, 50% (m/m)	5% m/m	”	Estragon (terragon)
(v)	Tartar sauce	Edible vegetable oil, 50% (m/m)	5% m/m	”	Capers
(vi)	Remoulade piquant or sharp sauce	Edible vegetable oil, 50% (m/m)	5% m/m	”	Mustard fine herbs
(vii)	Cocktail sauce	Edible vegetable oil, 50% (m/m)	5% m/m	”	Tomato ketchup
(viii)	Mustard sauce	Edible vegetable oil, 50% (m/m)	5% m/m	”	Mustard

*Technically pure means that 20 per cent of albumen is tolerated related to the egg yolk.
Note 1: The minimum egg content shall only apply to products where eggs have been used as ingredient. This parameter does not apply to eggless products

4.3 Optional Ingredients

The following ingredients among others may be added as optional ingredients to improve on the physical or organoleptic properties of the product or as technologically may be considered:

a) *Hen's egg white*

b) *Hen's egg products*

c) *Sugars*

d) *Food grade salt*

e) *Condiments, spices, herbs*

f) *Fruits and vegetables, including fruit juice and vegetable juice*

g) *Mustard*

h) *Dairy products*

i) *Water*

j) Starch

k) *Lemon*

l) Vitamins and Mineral

Note 1: It is recommended that iron and copper should be less that 5mg/kg and 1mg/kg as exceeding this limit may contribute to the product going rancid. However, when appropriately coated forms are used, the limit may be exceeded without the product going rancid

5. Food Additives

Only the food additives permitted in the Food, Drugs and Chemical Substances Act, Cap. 254 of the Laws of Kenya, KS CODEX STAN 192 or KS 660 may be used for the stated technological purpose and within the principles outlined in KS Codex Stan 192 without exceeding the stated limits.

6. Contaminants

6.1 Mayonnaise and mayonnaise-like products shall comply with KS CODEX STAN 193:2005. In addition the products when tested with validated method shall comply with heavy metal limits in Table 2 below

Table 2. Limits for heavy metal contaminants

Contaminant	limit (max)
Lead (pb)	0.2 mg/kg
Arsenic (As)	0.1 mg/kg

7. Hygiene

7.1 Mayonnaise and Mayonnaise products shall be manufactured in premises complying with the hygienic practices stipulated in the Public Health Act, Cap. 242, the Food, Drugs and Chemical substances Act, Cap. 254 of the Laws of Kenya and KS 05-1500, Code of practice for food and drink manufacturing industry.

7.2 When tested in accordance with KS 05-220, Methods of microbiological examination of foods, the Mayonnaise and Mayonnaise products shall be free from pathogenic organisms and shall comply with the microbiological limits given in Table 3.

Table 3 – Microbiological Limits

Characteristic	Requirement
Coliform bacteria count/g	shall be absent
Salmonella sp	Shall be absent in 25 g
Escherishia coli count/g	Shall be absent
Staphylococcus aureus count/g	shall be absent
Listeria count/25g	Shall be absent
Mould/yeast per gram	< 100

Note: Manufacturers are advised to ensure the total plate count is less than 10^4

7.3 The level of total aflatoxin in Mayonnaise and Mayonnaise products shall not exceed 10 ppb, wherein aflatoxin B_1 shall not be more than 5 ppb when tested according to KS ISO 16050.

7.4 The product covered by the provisions of this standard shall comply with the pesticide limits listed in KS 05-1051

8 Packaging

8.1 The product shall be packed in food grade material that shall ensure product safety and integrity.

8.2 The fill of the package shall comply with the Weights and Measures Act, Cap. 513 of the Laws of Kenya.

9.2 Labelling

9.2.1 General labelling requirements
The products shall be labelled according to KS EAS 38. In addition to the requirements the following specific provisions apply.

a) Name of the product shall be according to categories given in Table 1.
b) Brand name/registered trademark.
c) In case eggs other than hen's eggs and egg products are used, their origin shall be declared.
d) *Labelling prohibition* — No pictorial or written claim shall be made on the label to the presence of eggs or egg yolks unless the product contains at least 7.5 per cent of pure egg yolk on the basis of the total net weight of the product, except when equal prominence is given to a precise statement of the percentage of the pure egg yolk actually used.
e) Ingredients in descending order of proportion

9.2.2 Other requirements
The following information shall also be provided

a) name and address of the manufacturer/packer/importer;
b) batch or code number;
c) net weight in metric units;
d) Storage instruction
e) country of origin where applicable;
f) date of manufacture;
g) expiry date;
h) Nutritional information

Annex A

Determination of oil

A1. Pre-Extraction

A1.1 As high fat levels can prevent effective hydrolysis, samples with 10 per cent content shall be pre-extracted with the same type of solvent as used in the final extraction.

A1.2 Procedure

A1.2.1 Weigh in the sample with a precision of 1000 ± 2 mg. Load the glass thimble with 1 g celite and the sample. Do not cover with cotton.

A1.2.2 Fit adapters on the thimbles, by introducing them into the thimbles in such a way that the circlip is compressed progressively into the thimble, (i.e. the closed side of the circlip is pressed in first and then working towards the open side) and insert them into the Soxtec HT extraction unit.

A1.2.3 Add solvent and extract for 10 minutes in rinsing position.

A1.2.4 After the extraction, dry the extraction cups in an oven at 100 °C for 30 minutes. Let them cool down and weigh them. Calculate percentage extracted fat. If the fat content is higher than 20 per cent, it is recommended to use a second extraction cup for the final extraction.

A1.2.5 Remove the thimble holders from the glass thimbles. Transfer the pre-extracted sample as quantitatively as possible from the glass thimble to a sample tube for acid hydrolysis. Proceed from step 2 of the hydrolysis part.

A2. Hydrolysis

A2.1 Procedure

A2.1.1 Weigh the samples with a precision of 1000 ± 2 mg and transfer them to the sample tubes.

A2.1.2 Add 1g to 2 g of celite and 100 mL to 120 mL of the acid solution to each sample tube. The level of the acid solution shall be over the top of the cover of the heaters.

A2.1.3 Insert the tubes into position in the 1047 hydrolyzing unit. Lower the suction tubes to the fume exhaust position by pulling the handle upwards. The teflon part shall rest on the top of the sample tubes and suction tubes shall be about one centimetre down in the sample tubes.

A2.1.4 Place the glass thimbles into the thimble supports and insert them into the hydrolyzing unit.

A2.1.5 Start the water aspirator pump for the fume exhaust system. Open vacuum valves under each thimble. Adjust during boiling for low fume exhaust.

A2.1.6 Turn on the heater to maximum effect and place the reflector in front of the sample tubes. When the solution starts boiling, adjust to a gently boiling speed with the heater control.

A2.1.7 At the end of the hydrolyzing period, turn off the heater and remove the reflector.

A2.1.8 Open the cold water tap for the condensers (approximately 2 L/min).

A2.1.9 Pull down the suction tube handle. Dilute the acid solution in each tube with some 100 mL of 20 °C to 25 °C distilled water. Close the vacuum valve under each thimble.

A2.1.10 Lower the suction tubes. Open the vacuum valve under one thimble and suck up the sample solution and as much as possible of the solid particles in the solution. Close the valve and repeat in the same way with the rest of the tubes.

A2.1.11 Wash each tube by opening the vacuum valve and spray 5 mL x 50 mL of approximately 50 °C distilled water, by using the water sprayer.

A2.1.12 Raise the suction tubes and take out one of the sample tubes. Cover the cleaning rod with a thin layer of defalted cotton wool and wet it with acetone. Clean the inside of the tubes by gently pushing and pulling the cleaning rod up and down in the tube. Take a small piece of the cotton wool and clean the outside of the suction tube if necessary. Place each pad of the cotton wool on the top of the sample residue in the glass thimble.

A3. Drying

To make the wet sample residue hyophilic and achieve effective solvent extraction, the residue and thimble must be dried.

Alternative 1: Dry overnight at 60 °C to 80 °C in an oven.

Alternative 2: Dry in a microwave oven with turntable at medium power for 30 min to 60 min.

Most samples can be dried in a microwave oven, except meat and fish products.

A4. Procedure for Solvent Extraction

A4.1 Fit the adapters, as in **A1.2.2**, to each thimble and insert them into the Soxtec HT extraction unit.

A4.2 Extract and analyze the samples according to the soxtect HT extraction unit instructions (*see* Soxtec HT manual).

A5. CALCULATION

Calculate the fat content according to the formula below:

$$\text{Per cent fat} = \frac{W_3 - W_2}{W_1} \times 100$$

where,

W_3 = the extraction cup weight after fat extraction and cooling in a desiccator;

W_2 = clean and predried extraction cup;

W_1 = sample weight.

If a pre-extraction is required, using two extraction cups, add the two results that have been calculated, and the sum is the total fat in the sample.

$$\text{Per cent fat/oil} = F_1 + F_2$$

where,

F_1 = fat content after pre-extraction;

F_2 = fat content in final extraction.

Annex B

Determination of Egg-Yolk Solids

B1. General

The accurate estimation of egg-yolk solids in salad cream or mayonnaise is somewhat difficult. It is probably most frequently determined from phospholipid content. The following method, employing methanol, appears to give reasonably satisfactory results.

B2. Procedure

Reflux 20 g of salad cream with 100 mL of absolute methyl alcohol for 6 hours, stand overnight. Filter, re-extract the residue with methanol and wash through the filter with more solvent. Evaporate the combined filtrates containing the extracted organic phosphorus to dryness on the water bath. Transfer the residue to a digestive flask, wet oxidise with sulphuric-nitric acid and wash into a 100-mL volumetric flask. Make up to 100 mL at room temperature, mix and filter. Pipette 50 mL of filtrate into a further

100 mL volumetric flask, neutralize with ammonia (0.88), make just acid with dilute nitric acid, add 25 mL of vanadate-molybdate reagent and dilute to the mark. Mix and measure the absorbance at 270 nm.

B3. CALCULATION

Egg-yolk solids = P_2O_5 x 56

Dried egg = Egg-yolk solid x 1.48

The methanol extracts 1.20 per cent P_2O_5 from dried egg compared with 0.15 per cent from soya flour.

Annex C

Determination of Phosphorus (And Lecithin) In Egg-Yolk

C1. General

The determination of phosphorus and eventual calculation of lecithin may be used to determine the freshness of the egg.

C2. Procedure

C2.1 Pre-treatment

A (i) Extract 10 g of sample held in a filter thimble in the soxhlet apparatus for four hours with analytical grade chloroform.

(ii) Evaporate off all the chloroform in a platinum dish. Add 5 cm^3 of analytical chloroform and proceed as in **C**, omitting stage (i).

B (i) To 7.5 g sample, add 2.5 cm^3 distilled water and 70 cm^3 alcohol and shake.

(ii) Stand on a hot water bath for fifteen minutes making up the volume with additional alcohol where necessary.

(iii) Filter through a Whatman No. 4 grade filter paper into a 100 cm^3 graduated flask.

(iv) Wash the residue with benzene and make up the solution to 100 cm^3 with further additions of benzene.

(v) Shake to emulsify. Pipette 50 cm^3 of solution immediately into a clean platinum dish and proceed as in **C** below omitting stage (i).

C (i) Weigh 0.05 g of sample into a platinum dish. Add 5 cm^3 of analytical grade chloroform.

(ii) Add 8 cm^3 4 per cent alcoholic potash and evaporate to dryness in an oven held at 105 °C.

(iii) Char using an Argand burner and then ash at dull red heat in a muffle furnace.

(iv) When the dish has cooled, add 5 cm^3 concentrated hydrochloric acid and evaporate to dryness.

(v) Extract the residue with 10 cm^3 1 M hydrochloric acid. Filter through a Whatman No 54 grade filter paper into a 100 cm^3 graduated flask. Wash any residue with hot distilled water.

(vi) Neutralize with normal sodium hydroxide using phenolphthalein as indicator. Make to the mark with distilled water.

C2.2 Determination

(*a*) Take a sufficient volume by pipette of the prepared solution as will contain 5 ng to 50 ng phosphorus and transfer to a stout boiling tube. The total volume shall be 5 cm^3; if lower than this add distilled water.

(*b*) Add, by fast running pipette, 1 cm^3 20 per cent potassium iodide solution (containing 0.5 per cent sodium carbonate), then swirl.

(*c*) Stopper with a glass ball and hold in a boiling water bath for 15 minutes.

(*d*) Remove and cool in an icebath. Add sufficient freshly prepared 0.5 per cent sodium sulphite to remove the iodine colour and add to give a slight excess.

(*e*) Transfer the solution and make up to 50 cm^3 in a graduated flask (or smaller volume if found necessary).

(f) Measure the colour strength of the solution when held in a 1 cm glass cell using one litre ford 608 filters on the Spekker Absorptiometer.

(*g*) Carry out a check on the Absorptiometer.

C2.3 Calculation

(a) *Phosphorus* — Calculate the phosphorus content by reference to the previously prepared reference curve for a standard phosphorus solution. This solution can be prepared by dissolving 4.388 g analytical grade potassium dihydrogen phosphate in distilled water, adding 2 cm^3 concentrated sulphuric acid and making to 1 dm^3 in a graduated flask. The solution contains 1000 μg phosphorus/cm^3, lower concentrations can be obtained by solution. For comparison purposes, in a series of tests 1 μg phosphorus/cm^3 gives a Spekker absorptiometer reading of 0.285.

(*b*) *Lecithin* — Phosphorus multiplied by 25.5 equals lecithin content.

Annex D

Determination of Acid and Salt

D1. Apparatus

Usual laboratory apparatus.

D2. Reagents

0.1667 N NaOH (Sodium Hydroxide).

Phenolphthalein indicator solution (0.2 per cent in alcohol).

Solution of 2.0 per cent of potassium chromate in water plus 0.5 per cent citric acid (indicator).

Ag No_3 — 0.171 N.

D3. Preparation Of Sample

Mix sample well.

Weigh out 10 g sample on weighing dish, transfer to a 250 mL Erlenmeyer flask equipped with rubber stopper. Add 100 mL distilled water.

D4. Procedure

Titrate 10 g sample with 0.1667 N Na_2OH for acid using phenolphthalein indicator shaking vigorously when approaching the end point, a faint pink colour. Add approximately 5 cc of potassium chromate solution, also add a drop of a weak acetic acid or vinegar. Titrate with 0.171 N Ag NO_3 to a solmon pink colour end point for salt.

D5. Calculations

(*a*) Acid per cent (as Acetic)

$$= \frac{\text{mL NaOH Titration}}{10}$$

(*b*) Salt per cent

$$= \frac{\text{mL } AgNO_3 \text{ Titration}}{10}$$

Annex E

Dispersion Tests on Mayonnaise

Preparation and Calculation

Place a small particle of mayonnaise (the size of a pin head) on a microscope slide, cover with a cover glass, and smear into a thin film without using pressure. Observe through the 4 mm objective, with the eye piece micrometer in place, noticing whether the sizes of the globules are fairly uniform or irregular. Approximate the average globule size by counting the globules across 5 squares of the field, and averaging, using for the diameter of each square, the value obtained by calibration against the stage micrometer.

Sample is plated and measured with a 95 power oil immersion lens on the eye piece micrometer. The dispersion is determined in microns (one millionth of a meter).

NOTES: Division of micrometer - 1 square = 7.7 microns.

Normal dispersion for mayonnaise = 3 to 6 microns.

Annex F

Determination of Total Acid

F1. General

To check total acidity (as acetic) in cider and spirit vinegars either straight or blended.

F2. Apparatus

Erlenmeyer flasks, 250 mL
Pipette, 10 mL
Pipette, 25 mL
Volumetric flask, 250 mL

F3. Reagents

0.2500 N NaOH

Phenolphthalein indicator solution

F4. Procedure

Sample 10 mL at room temperature and shake well. Add approximately 10 cc distilled water to sample. Add 4 to 5 drops phenolphthalein indicator solution. Titrate with 0.2500 N NaOH to pink end point.

F5. Calculation

$$\text{Per cent acetic acid} = cc \times \frac{\textit{Milli equivalent weight of acetic acid}}{10\ \textit{cc sample}} \times \textit{Normality} \times 100$$